COVERED SOURCE PERMIT (CSP) REVIEW (0497-01-C)
Covered Source Permit Application No. 0497-01

APPLICANT:	County of Hawaii West Hawaii Solid Waste Landfill
RESPONSIBLE OFFICIAL:	Director Department of Environmental Management
AUTHORIZED REPRESENTATIVE	Mr. Joseph R. Whelan Vice President Waste Management of Hawaii 92-460 Farrington Hwy Kapolei, HI 96707
LOCATION	West Hawaii Sanitary Landfill 71-1111 Queen Kaahamanu Hwy. Waikoloa, HI 96738
MAILING ADDRESS	County of Hawaii 25 Aupuni Street Hilo, Hawaii
SIC CODE:	4953 (Refuse Systems)

PROPOSED PROJECT:
The proposed project is for the installation and operation of a landfill gas collection and control system (GCCS) for a municipal solid waste landfill. The project encompasses the West Hawaii Sanitary Landfill, located on the island of Hawaii. The landfill GCCS is being installed to comply with the requirements of Title 40 Code of Federal Regulations (CFR) subpart WWW. An existing 263 horsepower emergency stationary reciprocating internal combustion engine (RICE) has also been added to the equipment list.

The West Hawaii Solid Waste Landfill was opened in 1993. The design capacity of the landfill is 8,974,000 cubic meters. The proposed gas collection and control system will consist of the following:

1. Vertical Extraction Wells (49 in initial design plan)
2. Horizontal Connectors
3. Gas Collection System Piping
4. Condensate Collection and Management system
5. Flare (design capacity – 42.5 MMBtu/hr)

Pursuant to the federal regulations, the landfill gas collection and control system is required to:

- Collect gas from each area, cell or group of cells in the landfill in which the initial solid waste has been placed for a period of five (5) years or more if active; or two (2) years or more if closed or at final grade.

- Collect gas at a sufficient extraction rate; and
- Be designed to minimize the off-site migration of landfill gas

To insure that the gas collection system has a sufficient density of the landfill gas extraction points, the following criteria may be used:

- SEM reports;
- Site-specific conditions at the time of installation;
- Permeability of waste materials or final cover capping systems;
- Zone of influence (ZOI) estimates;
- Permeability of daily cover soils;
- Landfill Gas (LFG) generation rate;
- Moisture;
- LFG viscosity;
- Past Experience/Engineering Judgment;
- LFG temperature;
- Waste age; and
- Waste composition

The applicant states that, "This approach is consistent with spacing criteria used at other landfills and should effectively control surface emissions and subsurface migration of LFG in accordance with NSPS requirements." Based on extensive industry experience, the LFG collector spacing shown should be adequate to provide comprehensive control of the LFG as required. In the event that this spacing is not adequate to meet the required operating standards, additional collectors will be installed as necessary"

Each flare is designed to meet the following performance requirements:

- Maximum Btu/hr: 42.5 MMBtu/hr (1,400 scfm @ 50% CH_4)
- Minimum combustion temperature: 1400 °F
- Destruction efficiency: weighted average destruction efficiency greater than 98% of volatile organic compounds (NMOC's) across the full range of gas flow rates.

The stack for the flare is approximately 8 inches in diameter, twenty five (25) feet tall and is equipped with sample ports, temperature monitoring devices, propane pilot ignition system, UV flame detector assemblies, with a flame arrestor and pneumatic shutdown assembly at the flare inlet.

The extraction wells will be operated with a working vacuum that produces the highest sustainable flow of LPG without drawing in excessive air. Maximum well temperatures are to be maintained below 131 °F (55 °C) with an oxygen concentration of less than 5%. To demonstrate compliance with the operating parameter limits, the wells will be monitored monthly for pressure (vacuum) and temperature, along with methane, carbon dioxide, and oxygen concentrations. Wells determined to be operating outside of compliance limits will be adjusted by changing the amount of vacuum in the well.

The landfill surface is required to be monitored on a quarterly basis. If the surface readings exceed 500 parts per million (ppm) of methane, corrective action is required. The landfill is also required to perform a monthly cover inspection to check for air infiltration or landfill gas

migration. Other monitoring devices on the landfill gas collection and control system include a continuous temperature monitor for the flare and a continuous recording flow meter for monitoring landfill gas flow to the flare.

AIR POLLUTION CONTROL EQUIPMENT:
All of equipment to be installed is for control of MSW landfill gas emissions. Pursuant to Federal New Source Performance Standards, the collection and control system is required by NSPS to be designed and operated to reduce NMOC by 98 weight-percent, or to reduce the outlet NMOC concentration to less than twenty (20) ppm by volume, dry basis as hexane at three (3) percent oxygen.

APPLICABLE FEDERAL REQUIREMENTS:
40 CFR Part 60, New Source Performance Standards (NSPS):

Subpart A – *General Provisions; and*
Subpart WWW-*Standards of Performance for Municipal Solid Waste Landfills*

The facility is subject to the NSPS because the following criteria have been satisfied:

1. *The landfill was modified or constructed after May 30, 1991*. The West Hawaii Solid Waste Landfill was opened in 1993.
2. *The maximum capacity exceeds 2.5 million megagrams and 2.5 million cubic meters.* The application states that the capacity of the landfill is 8,974,000 cubic meters.

Landfills subject to the Federal requirements are also required to calculate annual NMOC emissions generated by their facility. Facilities that exceed 50 Mg/yr are required to install and operate a landfill gas collection and control system. Annual NMOC emissions from the West Hawaii Solid Waste Landfill are in excess of 50 Mg/yr, requiring the installation of the landfill gas collection and control system.

40 CFR Part 63, National Emission Standards for Hazardous Air Pollutants (NESHAP):

Subpart A - *National Emission Standards for Hazardous Air Pollutants for Source Categories, - General Provisions*;

Subpart AAAA - *National Emission Standards for Hazardous Air Pollutants: Municipal Solid Waste Landfills; and*

Subpart ZZZZ - *National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines*

The facility is subject to NESHAP for MSW landfills because waste was accepted after November 8, 1987, the design capacity is greater than 2.5 million megagrams and 2.5 million cubic meters, and the estimated uncontrolled nonmethane organic compound (NMOC) emissions is equal to or greater than 50 megagrams per year. Facilities are not subject to the NESHAP regulations unless the 50 Mg/yr annual emission limit is exceeded.

The NESHAP rule for landfill gas collection and control systems adds startup, shutdown and malfunction requirements, adds operating condition deviations for out-of-bounds monitoring

parameters, requires timely control of bioreactor landfills, and changes the reporting frequency for compliance reporting from annually to every six months.

The emergency DEG is subject to part ZZZZ, because it is a stationary RICE at a major or area source of HAP emissions, and the stationary RICE is not being tested at a stationary RICE test cell/stand. The emergency DEG is considered to be an existing stationary RICE because it is located at an area source of HAP emissions, and construction commenced in 1993, which is before the June 12, 2006 date used to determine if a DEG is new or existing.

Existing emergency stationary RICE located at an area source of HAP emissions is subject to the requirements of 40 CFR 63, Subpart ZZZZ, Subsection 63.6635(f), which states:

"Requirements for emergency stationary RICE. (1) If you own or operate an existing emergency stationary RICE with a site rating of less than or equal to 500 brake HP located at a major source of HAP emissions, a new or reconstructed emergency stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions that was installed on or after June 12, 2006, or an existing emergency stationary RICE located at an area source of HAP emissions, you must operate the emergency stationary RICE according to the requirements in paragraphs (f)(1)(i) through (iii) of this section. Any operation other than emergency operation, maintenance and testing, and operation in non-emergency situations for fifty (50) hours per year, as described in paragraphs (f)(1)(i) through (iii) of this section, is prohibited. If you do not operate the engine according to the requirements in paragraphs (f)(1)(i) through (iii) of this section, the engine will not be considered an emergency engine under this subpart and will need to meet all requirements for non-emergency engines.

(i) There is no time limit on the use of emergency stationary RICE in emergency situations.

(ii) You may operate your emergency stationary RICE for the purpose of maintenance checks and readiness testing, provided that the tests are recommended by Federal, State or local government, the manufacturer, the vendor, or the insurance company associated with the engine. Maintenance checks and readiness testing of such units is limited to 100 hours per year. The owner or operator may petition the Administrator for approval of additional hours to be used for maintenance checks and readiness testing, but a petition is not required if the owner or operator maintains records indicating that Federal, State, or local standards require maintenance and testing of emergency RICE beyond 100 hours per year.

(iii) You may operate your emergency stationary RICE up to fifty (50) hours per year in non-emergency situations, but those fifty (50) hours are counted towards the 100 hours per year provided for maintenance and testing. The fifty (50) hours per year for non-emergency situations cannot be used for peak shaving or to generate income for a facility to supply power to an electric grid or otherwise supply power as part of a financial arrangement with another entity; except that owners and operators may operate the emergency engine for a maximum of fifteen (15) hours per year as part of a demand response program, if the regional transmission organization or equivalent balancing authority and transmission operator has determined there are emergency conditions that could lead to a potential electrical blackout, such as unusually low frequency, equipment overload, capacity or energy deficiency, or unacceptable voltage level. The engine may not be operated for more than thirty (30) minutes prior to the time when the emergency condition is expected to occur, and the engine operation must be terminated immediately

after the facility is notified that the emergency condition is no longer imminent. The fifteen (15) hours per year of demand response operation are counted as part of the fifty (50) hours of operation per year provided for non-emergency situations. The supply of emergency power to another entity or entities pursuant to financial arrangement is not limited by this paragraph (f)(1)(iii), as long as the power provided by the financial arrangement is limited to emergency power."

To insure that the emergency stationary RICE is operated in compliance with the requirements, conditions limiting the operation of the emergency stationary RICE will be added to the permit.

Also, pursuant to Subsection 63.6625(e)(3), a condition will be added to the permit which states that "if you own or operate an existing emergency or black start stationary RICE located at an area source of HAP emissions, you must operate and maintain the stationary RICE and after-treatment control device (if any) according to the manufacturer's emission-related written instructions or develop your own maintenance plan which must provide to the extent practicable for the maintenance and operation of the engine in a manner consistent with good air pollution control practices for minimizing emissions."

APPLICABLE STATE REQUIREMENTS:

Hawaii Administrative Rules (HAR)
Chapter 11-59, Ambient Air Quality Standards
Chapter 11-60.1, Air Pollution Control
- Subchapter 1, General Requirements
- Subchapter 2, General Prohibitions
  - 11-60.1-31 Applicability
  - 11-60.1-32 Visible Emissions
  - 11-60.1-33 Fugitive Dust
  - 11-60.1-38 Sulfur Oxides from fuel combustion
- Subchapter 5, Covered Sources
- Subchapter 6, Fees for Covered Sources, Noncovered Sources, & Agricultural Burning
  - 11-60.1-111 Definitions
  - 11-60.1-112 General fee provisions for covered sources
  - 11-60.1-113 Application fees for covered sources
  - 11-60.1-114 Annual fees for covered sources
- Subchapter 8, Standards of Performance for Stationary Sources
- Subchapter 9, Hazardous Air Pollution Sources

NONAPPLICABLE REQUIREMENTS:

PREVENTION OF SIGNIFICANT DETERIORATION (PSD):

PSD applies to new stationary sources in an attainment area which emit or have the potential to emit 250 TPY (or 100 TPY for 28 named source categories) of any regulated pollutant, to a major stationary source making a major modification involving a significant net emissions increase (e.g., fifteen (15) tons per year PM_{10} [HAR 11-60.1-1]), or to a non-major source undergoing a modification that is major by itself. Since the proposed facility is not classified as one of the source categories with a 100 ton per year PSD trigger, the major stationary source cutoff is 250 tons per year. The West Hawaii landfill and does not have a pollutant that exceeds 250 tons per year, ten (10) tons of any individual HAP or twenty five (25) tons total HAPs, so a PSD review is not required for this application, with the possible exception of CO_2.

PSD applicability for CO_2 is determined by calculating the equivalent CO_2 emissions (CO_2e) generated by the facility. CO_2e emissions in excess of 100,000 tons per year require a PSD review.

The CO_2e levels were determined by utilizing EPA's Landfill Gas Emissions Model (LandGEM) program. For conservatism, the peak year of emissions, as determined by LandGEM, was used in determining the emission amounts. The equivalent CO_2 emission amounts are presented in the following table:

Type	Biogenic (tpy CO_2e)	Anthropogenic (tpy CO_2e)	Combined (tpy CO_2e)
Fugitive	5,617.71	35,171.57	40,789.28
Stack	42,709.14	107.74	42,816.88
Combined	48,326.85	35,279.31	83,606.16

CO_2e emissions are less than 100,000 tons per year, so a PSD review for CO_2 is not required.

BEST AVAILABLE CONTROL TECHNOLOGY (BACT) REQUIREMENTS:
Pursuant to HAR §11-60.1-81(14), the application of BACT is required for all pollutants that have the potential to emit or increase emissions above significant amounts considering any limitations, enforceable by the director, on the covered source to emit a pollutant.

To determine what constitutes a significant amount, refer to the definition of "significant" listed in HAR §11-60.1-1. Pursuant to the definition, a "significant" amount is a rate of emissions that would equal or exceed an of the following pollutant and emission rates:

Pollutant	Significant Level (tpy)	Calculated Emissions (tpy)
Carbon Monoxide	100	68.97
Nitrogen Oxides	40	13.08
Sulfur dioxide	40	18.33
PM	25	2.93
PM_{10}	15	2.93
Ozone	40 of VOC	1.08
Lead	0.6	0
Asbestos	0.007	0
Beryllium	0.0004	0
Mercury	0.1	0
Vinyl Chloride	1	0
Fluorides	3	0
Sulfuric acid mist	7	0
Total reduced sulfur	10	0
Reduced sulfur compounds	10	0

Since the significant level was not exceeded for any of the listed pollutants, a BACT analysis is not required.

CONSOLIDATED EMISSIONS REPORTING RULE (CERR):
Consolidated Emissions Reporting Rule (CERR) is not an applicable requirement because annual emissions from the facility do not exceed the minimum than reporting levels for a Type B source pursuant to 40, CFR 51, Subpart A. (see following table)

CERR Reporting Requirements

Pollutant	Facility Emissions (tpy)	CERR Triggering Levels (tpy)	
		1-yr Reporting Cycle (Type A Sources)	3-yr Reporting Cycle (Type B Sources)
VOC	1.08	≥ 250	≥ 100
PM_{10}	19.53	≥ 250	≥ 100
$PM_{2.5}$	4.96	≥ 250	≥ 100
NO_x	13.08	≥ 2,500	≥ 100
SO_x	18.33	≥ 2,500	≥ 100
CO	68.97	≥ 2,500	≥ 1,000
HAPs (total)	1.15	n/a	n/a

SYNTHETIC MINOR APPLICABILITY:
The facility does not propose any operational restrictions to stay below major source emission levels. Therefore, the facility is not a synthetic minor source.

COMPLIANCE ASSURANCE MONITORING:
Compliance Assurance Monitoring (CAM) applies to facilities that fulfill all of the following criteria:

- Facility is a major source that is required to obtain a part 70 (Title V) or 71 (Federal Plan) permit.
- Facility is subject to emission limitation or standard for the applicable pollutant.
- Facility uses a control device to achieve compliance.
- Potential pre-control emissions of applicable pollutant are at least 100 percent of major source amount
- Facility. is subject to a federal standard (NSPS or NESHAPS) promulgated before November 15, 1990.

The MSW landfill NSPS (40 CFR 60 Subpart WWW) was promulgated on March 12, 1996. and the NESHAP for stationary RICE was promulgated on June 15, 2004. Therefore, the landfill gas collection and control equipment and the emergency stationary RICE are exempt from CAM provisions.

INSIGNIFICANT ACTIVITIES/EXCEPTIONS:
Insignificant activities at the facility consist of the following:

Unit ID	Description	Citation	Capacity
AST1	Diesel Tank in water tank pumping area	HAR 11-60.1-82(f)(1)	1,000 gallons
AST2	Diesel tank in maintenance shop/equipment fueling area	HAR 11-60.1-82(f)(1)	2,000 gallons
AST3	Diesel tank in maintenance shop/equipment fueling area	HAR 11-60.1-82(f)(1)	2,000 gallons
AST4	Diesel tank in maintenance shop/equipment fueling area	HAR 11-60.1-82(f)(1)	2,000 gallons
AST5	Used oil tank in maintenance shop	HAR 11-60.1-82(f)(1)	350 gallons
AST6	Engine oil tank in maintenance shop	HAR 11-60.1-82(f)(1)	300 gallons
AST7	Hyadraulic oil tank in maintenance shop	HAR 11-60.1-82(f)(1)	300 gallons
AST8	Diesel tank in maintenance shop/equipment refueling area	HAR 11-60.1-82(f)(1)	300 gallons
AST9	Leachate tank	HAR 11-60.1-82(f)(1)	10,000 gallons

Unit ID	Description	Citation	Capacity
AST10	Leachate tank	HAR 11-60.1-82(f)(1)	10,000 gallons
AST11	Leachate tank	HAR 11-60.1-82(f)(1)	10,000 gallons
AST12	Leachate tank	HAR 11-60.1-82(f)(1)	10,000 gallons

ALTERNATIVE OPERATING SCENARIOS:
No alternate operating scenarios were proposed by the applicant.

PROJECT EMISSIONS:
Upon installation of the landfill gas collection and control system, air emissions from the landfill will consist of emissions from the flaring of landfill gas, surface emissions from the landfill itself, road emissions from vehicle travel, and from use of the emergency diesel engine generator.

To determine the emissions from the flares, it was assumed that the landfill gas has a methane concentration of 50% by volume, and the landfill gas is saturated with water vapor. The calculated flare emissions are:

Adjusted Flow Rate:	656.09	cubic feet/min of Methane
	9,365.58	cubic feet/hr of Methane
	3.94E-02	million cubic feet/hour Methane
	84,000	cubic feet/hour of landfill gas
Flare Heat Capacity	42.5	MMBtu/hr

Pollutant	Emission Factor	Units	(lb/hr)	(g/s)	(ton/yr)
NO_2	0.068	lb/MMBtu	2.890	0.364	12.658
CO	0.37	lb/MMBtu	15.725	1.981	68.876
PM_{25}[2]	17	lb/10^6 dscf Methane	0.669	0.084	2.931
SO_2	4.98E-05	lb/scf landfill gas	4.185	0.527	18.329
VOC[3]	0.000133	lb/scf landfill gas	0.240	0.030	1.051

Notes:

1. PM Emission factors obtained from AP-42, table 2.4.5 (11/98)
2. Pursuant to table 2.4.5, footnote b; PM=PM10=PM25.
3. VOC emission factor assumes 98% of VOC destroyed by flare.
4. SO2 and VOC emission factors obtained by mass balance.
5. NO2 and CO emissions factor obtained from manufacturer.

Hazardous Air Pollutant (HAP) emissions from the flare are derived using landfill gas concentrations referenced in AP-42, section 2.4, Municipal Solid Waste Landfills and the specified flow rate for the flare. HAP flare emissions are:

LANDFILL FLARE HAP EMISSIONS

Flare flow rate	1400	ft^3/min
LFG Generation Rate	20,836,666	m^3/yr
Flare destruction efficiency	98%	

Pollutant	Median ppmv	Mol. Wt (g/g-mole)	Grav. Conc. (mg/m^3)	Uncontrolled Emissions (tpy)	Controlled Emissions (tpy)
1,1,1-Trichloroethane (methyl chloroform)	0.48	133.41	2.66	6.12E-02	1.22E-03
1,1,2,2-Tetrachloroethane	1.11	167.85	7.75	1.78E-01	3.56E-03

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1,1-Dichloroethane (ethylidene dichloride)	2.35	98.97	9.67	2.22E-01	4.44E-03
1,1-Dichloroethene (vinylidene chloride)	0.2	96.94	0.81	1.85E-02	3.70E-04
1,2-Dichloroethane (ethylene dichloride)	0.41	98.96	1.69	3.88E-02	7.75E-04
1,2-Dichloropropane (propylene dichloride)	0.18	112.99	0.85	1.94E-02	3.89E-04
Acrylonitrile	6.33	53.06	13.97	3.21E-01	6.42E-03
Carbon disulfide	0.58	76.13	1.84	4.22E-02	8.44E-04
Carbon tetrachloride	0.004	153.84	0.03	5.88E-04	1.18E-05
Carbonyl sulfide	0.49	60.07	1.22	2.81E-02	5.62E-04
Chlorobenzene	0.25	112.56	1.17	2.69E-02	5.38E-04
Chloroethane (ethyl chloride)	1.25	64.52	3.35	7.71E-02	1.54E-03
Chloroform	0.03	119.39	0.15	3.42E-03	6.84E-05
Chloromethane	1.21	50.49	2.54	5.84E-02	1.17E-03
Dichloromethane (methylene chloride)	14.3	84.94	50.53	1.16E+00	2.32E-02
Ethylbenzene	4.61	106.16	20.36	4.68E-01	9.35E-03
Hexane (n)	6.57	86.18	23.55	5.41E-01	1.08E-02
Hydrogen sulfide	35.5	34.08	50.33	1.16E+00	2.31E-02
Mercury (total)	2.53E-04	200.61	0.00	4.85E-05	9.70E-07
Methyl isobutyl ketone	1.87	100.16	7.79	1.79E-01	3.58E-03
Pentane (n)	3.29	72.15	9.87	2.27E-01	4.54E-03
Perchloroethylene (tetrachloroethylene)	3.73	165.83	25.73	5.91E-01	1.18E-02
Trichloroethylene (trichloroethene)	2.82	131.38	15.41	3.54E-01	7.08E-03
Vinyl chloride	7.34	62.5	19.08	4.38E-01	8.77E-03
Xylenes (mixed)	12.1	106.16	53.43	1.23E+00	2.45E-02
Benzene	1.91	78.11	6.21	1.43E-01	2.85E-03
Toluene	39.3	92.13	150.61	3.46E+00	6.92E-02
Hydrochloric Acid	N/A	N/A	N/A	4.60E+01	9.20E-01
				TOTAL HAPs	1.14E+00

Abbreviations:
Mol. = Molecular
Wt. = Weight
Grav. = Gravimetric
Conc. = Concentration
Gen. = Generation

Fugitive HAP emissions were determined using landfill gas concentrations referenced in AP-42, Section 2.4, Municipal Solid Waste Landfills. It was assumed that the LGCS system has an efficiency of 75%, the flow rate was assumed to be 25% of the landfill gas flow rate determined by LandGEM. Fugitive HAP emissions are as follows:

LANDFILL FUGITIVE HAP EMISSIONS

LFG Generation Rate	1,340	ft^3/min
Collection system efficiency	75%	
Controlled landfill fugitive gas flow rate	335	ft^3/min
	4.99E+06	m^3/yr

Pollutant	Median ppmv	Mol. Wt (g/g-mole)	Grav. Conc. (mg/m^3)	Uncontrolled Emissions (tpy)
1,1,1-Trichloroethane (methyl chloroform)	0.48	133.41	2.66	9.84E-07

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LFG Generation Rate	1,340	ft^3/min
Collection system efficiency	75%	
Controlled landfill fugitive gas flow rate	335	ft^3/min
	4.99E+06	m^3/yr

Pollutant	Median ppmv	Mol. Wt (g/g-mole)	Grav. Conc. (mg/m^3)	Uncontrolled Emissions (tpy)
1,1,2,2-Tetrachloroethane	1.11	167.85	7.75	2.86E-06
1,1-Dichloroethane (ethylidene dichloride)	2.35	98.97	9.67	3.57E-06
1,1-Dichloroethene (vinylidene chloride)	0.2	96.94	0.81	2.98E-07
1,2-Dichloroethane (ethylene dichloride)	0.41	98.96	1.69	6.23E-07
1,2-Dichloropropane (propylene dichloride)	0.18	112.99	0.85	3.12E-07
Acrylonitrile	6.33	53.06	13.97	5.16E-06
Carbon disulfide	0.58	76.13	1.84	6.78E-07
Carbon tetrachloride	0.004	153.84	0.03	9.45E-09
Carbonyl sulfide	0.49	60.07	1.22	4.52E-07
Chlorobenzene	0.25	112.56	1.17	4.32E-07
Chloroethane (ethyl chloride)	1.25	64.52	3.35	1.24E-06
Chloroform	0.03	119.39	0.15	5.50E-08
Chloromethane	1.21	50.49	2.54	9.38E-07
Dichloromethane (methylene chloride)	14.3	84.94	50.53	1.87E-05
Ethylbenzene	4.61	106.16	20.36	7.52E-06
Hexane (n)	6.57	86.18	23.55	8.70E-06
Hydrogen sulfide	35.5	34.08	50.33	1.86E-05
Mercury (total)	2.53E-04	200.61	0.00	7.80E-10
Methyl isobutyl ketone	1.87	100.16	7.79	2.88E-06
Pentane (n)	3.29	72.15	9.87	3.65E-06
Perchloroethylene (tetrachloroethylene)	3.73	165.83	25.73	9.50E-06
Trichloroethylene (trichloroethene)	2.82	131.38	15.41	5.69E-06
Vinyl chloride	7.34	62.5	19.08	7.05E-06
Xylenes (mixed)	12.1	106.16	53.43	1.97E-05
Benzene	1.91	78.11	6.21	2.29E-06
Toluene	39.3	92.13	150.61	5.56E-05
			TOTAL	1.77E-04

Total Fugitive NMOC Emissions	29.35	Mg/yr	32.35	tpy
Collection system efficiency	75%		75%	
Fugitive NMOC Emissions (after controls)	7.34	Mg/yr	8.09	tpy
Assuming VOC=39% NMOC pursuant to AP-42				
Fugitive VOC emissions	2.86	Mg/yr	3.15	tpy

The emissions from the emergency stationary RICE were calculated using AP-42, Section 3.3 (10/96). It was assumed that the generator will operate no more than 100 hours per year, with a maximum fuel consumption rate of 13.6 gallons per hour. The emissions are summarized in the following table:

Pollutant	Emission Factor (lb/MMBtu)	Emissions		
		(lb/hr)	Max (tpy)	Limited (tpy)
SO_2	0.0505	0.10	0.42	4.81e-03
NO_2	4.41	8.40	36.78	0.42
CO	0.95	1.81	7.92	0.09
VOC	0.35	0.67	2.92	0.03
PM_{25}	0.31	0.59	2.59	0.03

Pollutant	Emission Factor (lb/MMBtu)	Emissions		
		(lb/hr)	Max (tpy)	Limited (tpy)
PM_{10}	0.31	0.59	2.59	0.03
PM	0.31	0.59	2.59	0.03
HAPs (total)			0.64	0.01

The emissions from the landfill gas flare, landfill fugitive emissions and emergency stationary RICE consists of the following:

West Hawaii Landfill Emissions Summary

ITEM	Emissions (tpy)								
	NO_x	CO	SO_x	PM	PM_{10}	PM_{25}	HAP	NMOC	VOC
Emergency DEG emissions	0.42	0.09	0.00	0.03	0.03	0.03	0.01		0.03
Flare Emissions	12.66	68.88	18.33	2.93	2.93	2.93	1.14	2.70	1.05
Landfill Fugitive Emissions							5.56E-05	0.75	0.00
Fugitive Roadway Emissions				64.44	16.56	2.00			
Total Emissions	13.08	68.97	18.33	67.40	19.53	4.96	1.15	3.45	1.08

AMBIENT AIR QUALITY ASSESSMENT:

To determine the ambient air impact from the gas collection and control system, the EPA approved AERSCREEN modeling program was used. Parameter settings used in the assessment included simple terrain, default meteorology, and rural input setting. Building downwash was not considered, since no buildings are located in the vicinity of the landfill. Fugitive emissions and area sources are not required to be modeled because not a point source of emissions. The analysis only addresses emissions from the flare since it is the only point source of emissions.

The input parameters used in the model are:

EMISSION RATES AND STACK PARAMETERS FOR AIR MODELING

EMISSION RATES (g/s)					STACK PARAMETERS			
SO_2	NO_X	CO	PM_{10}	Pb	Height (m)	Temp (K)	Velocity (m/s)	Diameter (m)
1.0	1.0	1.0	1.0	N/A	7.62	1033.15	21.508	0.203

The result from the model demonstrated that the normalized concentration was 200.3 µg/m^3 per g/s. The normalized concentration is then multiplied by the emission rates for the pollutants in question, and background ambient air concentrations are added. A summary of the ambient air quality impacts is shown in the following table:

Normalized Concentration =			200.3	µg/m^3 per g/s				
Pollutant	**Avg. Period**	**Emission Rate (g/s)**	**Time Factor**	**CONCENTRATION (µg/m^3)**				**% of std.**
				Conc.	**Bkgrnd[2]**	**Total**	**Std**	
CO	1-HR	1.981	1	396.79	2,519	2,916	10,000	29.2
	8-HR	1.981	0.9	357.11	1,145	1502	5,000	30.0
NO_x	1-HR	0.364	1	72.91	50.8	124	188	65.8
	Ann.	0.364	0.2	14.58	5.6	20	70	28.8
PM_{10}	24-HR	0.084	0.4	6.73	57	64	150	42.5
	Ann.	0.084	0.2	3.37	12	15	50	30.7
PM_{25}	24-HR	0.084	0.4	6.73	12.2	18.9	35	54.1
	Ann.	0.084	0.2	3.37	4.7	8	15	53.8
SO_2	1-HR	0.527	1	105.56	17	123	196	62.5
	3-HR	0.527	0.9	95.00	28.6	124	1,300	9.5
	24-HR	0.527	0.4	42.22	8.6	51	365	13.9
	Ann.	0.527	0.2	21.11	2.9	24	80	30.0

Notes:
1. Background concentrations obtained from State of Hawaii Annual Summary 2010 Air Quality Data Report. Worst-case value used, with the exception of SO2. SO2 concentration from Honolulu Monitoring station. Island of Hawaii SO2 background data for 2010 pending validation from EPA.

The ambient air quality analysis demonstrates that the operation of the equipment complies with State and Federal ambient air quality standards.

OTHER ISSUES:
None

SIGNIFICANT PERMIT CONDITIONS:
None

CONCLUSION AND RECOMMENDATION:
The construction and operation of the gas collection and control system for the West Hawaii Municipal Solid Waste Landfill complies with all applicable state and federal requirements. Recommend issuance of covered source permit pending 30 day public comment period and 45-day EPA review.

Kevin Kihara
April 2, 2013